ABSTRACT

The stress of a sample semiconductor wafer is detected with high accuracy in the form of an absolute value without rotating the sample or the entire optical system.

A laser light R is subjected to photoelastic modulation in a PEM 6 to generate a birefringence phase difference and then it is passed through first and second quarter wavelength plates and detected. This reference signal data is stored in a signal processor. The laser light R of polarized wave subjected to photoelastic modulation in the PEM 6 and passed through the quarter wavelength plate has a birefringence phase difference and passes through a semiconductor wafer D having residual stress. When it is passed through a test piece, the direction of the stress of the test piece is detected when the angle between the laser light R and a linear polarization light is 0 and 90 degrees. The transmitted electric signal is delivered to an analog/digital converter 16, and the signal from which is input to a signal processor thus generating transmission signal data. The signal processor reads out the stored reference signal data and the transmission signal data and calculates there from a reference birefringence phase difference and the absolute values of the birefringence phase difference.